

In *Manucodia atra* the trachea forms only "a short loop lying on the interclavicular air-cell, between the rami of the furcula, much as in many specimens of the genus *Craa*." In *Manucodia chalybeata* and *M. jobiensis* the loop extends about two thirds down the surface of the pectoral muscles.

Manucodia comrii (fig. 2, p. 513) has a much more extensive loop than any other species: in the specimen before me the two sections of the trachea which form the loop run closely adherent to each other in a slightly sinuous course to the left of the sternal keel; they are directed beyond the pectoral muscles somewhat obliquely, and finally end on the right side of the body in the immediate neighbourhood of the cloaca, slightly overlapping the posterior border of the thigh-muscles. The accompanying figure, which is of natural size, will give a correct idea of the course of the loop.

The bird proved on dissection to be a male.

The species *Manucodia comrii* was described some years ago* by Mr. Selater as "the finest and largest" of the genus; the bill is longer and the curling of the feathers of the head is carried to a greater extent. It is interesting to find the tracheal loop also showing a more pronounced character than in other species.

XLIII.—On Recent Advances in our Knowledge of the Geographical Distribution of Birds. By the EDITOR†.

It is now nearly thirty-four years ago since I read before the Linnean Society of London a memoir on the geographical distribution of the Class of Birds (1)‡, in which, after a preliminary discussion upon the subject, I pointed out what I considered to be a most natural way of dividing the earth's surface, looking only to the distribution of the families,

* "On the Birds collected by Dr. Comrie on the South-east Coast of New Guinea during the Survey of H.M.S. 'Basilisk,'" P. Z. S. 1876, p. 459.

† Slightly modified from an Address to the Second International Ornithological Congress at Budapest in May 1891.

‡ The numbers in brackets refer to the titles of works given in the Appendix, pp. 548-557.

genera, and species of the Class of Birds as our guide. In the first place I showed that, as regards their bird-life, Europe and Northern Asia are quite inseparable, the same or nearly the same avifauna extending all across the temperate portion of the Old World from England to Japan. Again I pointed out that Africa north of the Atlas, along the southern shores of the Mediterranean, also belonged to Europe zoologically, and not to the continent to which it is physically joined. I therefore maintained that we must consider Africa north of the Atlas, Europe, and Northern Asia to form one primary division of the earth's surface, to which the name "PALEARCTIC REGION" would be best applicable.

The great continent of Africa, after cutting off the portion north of the Atlas, would form, as I showed, a second well-marked division of the earth's surface. This would include Madagascar, which, however, had manifestly a peculiar development of its own, as also Western Arabia as far as the Persian Gulf; for in this part of Asia African types seemed to predominate over Indian. This second division of the earth's surface I proposed to call the "ETHIOPIAN REGION."

A third primary region appeared to be constituted by Southern Asia and the adjacent islands of the Indian Archipelago down to (what is now called) Wallace's line. This region would certainly embrace Sumatra, Java, Borneo, and the Philippines; but its southern boundary was at that period a little uncertain. This region I proposed in 1857 to call the "Indian" Region. Mr. Wallace subsequently proposed to alter its name to the "ORIENTAL" REGION, and I have had great pleasure in following his suggestion.

A fourth principal division of the Old World, taking birds as our guide, I proposed to denominate the "AUSTRALIAN REGION." This would embrace New Guinea and the adjoining islands, in which the facies of bird-life was manifestly of an Australian type, Australia itself, and New Zealand and the Pacific Islands. According to this plan we should have in the Old World one great Temperate Region (Palearctic) and three more or less Tropical (Palæotropical) Regions, the most eastern one of these (the Australian) extending rather

farther to the south than the others, whilst the Indian or middle Palæotropical Region is rather the most northern of the three.

As regards the New World, I showed that it might be most simply divided into a northern and southern portion by a line drawn across the continent somewhere towards the south of Mexico. The northern of these two divisions, the avifauna of which presented many undoubted points of resemblance to that of the Palæarctic Region, I proposed to call the "NEARCTIC REGION." For the southern division, which embraced the whole of South America, the West-India Islands, and Central America up to Southern Mexico, I suggested the term "NEOTROPICAL REGION," and pointed out that, with the exception possibly of New Guinea, it possessed by far the richest and most peculiar avifauna of any part of the earth's surface.

To recapitulate, therefore, I proposed to divide the earth's surface, so far as its bird-life is concerned, into the six following regions :—

I. *The Palæarctic Region*, including Europe, Northern Asia, and Northern Africa down to the Atlas.

II. *The Ethiopian Region*, including Africa south of the Atlas, Madagascar, and Arabia.

III. *The Oriental Region*, including Asia south of the Himalayas and the Indian Archipelago down to Wallace's line.

IV. *The Australian Region*, including the Moluccas, New Guinea and the adjacent islands south of Wallace's line, Australia, New Zealand, and the South Pacific Islands.

V. *The Nearctic Region*, including North America down to Southern Mexico.

VI. *The Neotropical Region*, including Central America, the West-India Islands, and South America.

During the thirty-four years which have elapsed since this plan of the division of the earth's surface for Ornithological purposes was put forward, I need hardly say that many other schemes of a similar nature have been propounded. Some of these have been modifications, more or less material, of my original arrangement ; others, such as that of Herr Reiche-

now (2), have started on altogether different principles, and have divided up the earth's surface in an entirely different way. I trust, however, that on the present occasion I may be excused from discussing these different schemes. But I may be allowed to point out with pride that the great naturalist Alfred Russel Wallace, who has written the best and most complete book that has yet been issued on the geographical distribution of animals (3), has entirely adopted the divisions which I originally proposed and the nomenclature consequent thereon*, and has based the whole of his work upon the principles which I put forward in 1858.

Mr. Wallace has well pointed out that, so long as we do not violate any clear affinities or produce any glaring irregularities, it is a positive and by no means unimportant advantage to "have our principal regions nearly approximate in size, and with easily defined, and therefore easily remembered, boundaries." As he truly states, the most obvious zoological division of the earth would be made by separating the Australian Region from the rest of the world, there being no doubt that the Australian fauna is by itself of quite as great peculiarity as that of the whole of the rest of the world taken together. But when this has been done we have not advanced the subject very far, being only able to say that a certain group of animals is "Australian" or "non-Australian." A second great natural division may readily be made by cutting off the Neotropical Region from the rest of the world. After deducting the Australian Region, it could easily be shown that the Neotropical Region has more special groups of animals peculiar to itself than the four remaining divisions of the world put together. Upon doing this we should have three primary divisions of the earth's surface, which I agree with Prof. Huxley (4) and other writers in recognizing as of tolerably equivalent zoological importance. But it would be a great practical inconvenience to unite the whole of the northern portion of the world under one designation, even if

* With the exception of the alteration of the "Indian" Region into "Oriental," as already mentioned.

there were good grounds for adopting this course. Mr. Wallace, in his excellent chapter on zoological regions, has gone fully into the arguments upon this subject, and I will not repeat them here. I admit with him that my six regions are not of precisely equal rank, and that some of them are far more isolated and better characterized than the others. But I also maintain with him "that, looked at from every point of view, they are more equal in rank than any others that can be formed; while in geographical equality, compactness of area, and facility of definition, they are beyond all comparison better than any others that have yet been proposed for the purpose of facilitating the study of geographical distribution."

After more than thirty-five years' close attention to the subject and a constant study of all that has been written upon it by my brother workers, I am still convinced that, for the study of vertebrate animals at least, this six-fold division of the earth's surface will be found to be more natural and more convenient than any other arrangement that has yet been suggested. On the present occasion, however, we are engaged only with the Class of Birds, on the study of which I originally based the six regions, and for which I maintain they are eminently suitable. I will proceed now to take these six regions one after the other, to point out some of the principal characters which pertain to each of them, and to mention the leading recent authorities to be referred to by those who wish to gain an idea of the peculiarities of their respective avifaunas.

I.—THE PALÆARCTIC REGION (*Regio Palæarctica*).

(a) *Extent*.—Africa north of the Atlas, Europe, Asia Minor, Persia and Asia generally north of the Himalayan range, upper part of the Himalayan range, Northern China, Japan, and the Aleutian Islands.

(b) *Characteristic Forms*.—As I pointed out in my original essay, before referred to, the Palæarctic or great Temperate Region of the Old World is not so well supplied with peculiar types as the remaining regions, and therefore, as regards its

birds, is not so easily differentiated. Although, as Mr. Wallace has shown, our knowledge of this subject has been much improved since my essay was written, in consequence of the great advances made during recent years in the investigation of the birds of Central Asia, I think that this statement still holds good, but not to so great an extent as at the time when I made it. In the Palæarctic Ornis generally the SYLVIIDÆ or Warblers probably play the most important part amongst Passerine birds. According to Mr. Wallace's tables, no less than 14 genera of this family are either essentially or characteristically Palæarctic. Of these, *Locustella*, *Daulias*, and *Erithacus* are good examples. Others are *Sylvia*, *Ruticilla*, *Regulus*, and *Accentor*, though these are not quite so exclusively Palæarctic.

A second Passerine group highly characteristic of the Palæarctic Region, though by no means exclusively confined to it, is the FRINGILLIDÆ, containing the Finches and Buntings. At least 12 genera of this family are nearly or quite restricted to the Palæarctic Region. Of these, *Fringilla*, *Pyrrhula*, and *Emberiza* are good illustrative forms. The CORVIDÆ or Crow family is a third Passerine group very characteristic of the Palæarctic Region, though some of the genera are found in nearly every other part of the world. *Fregilus*, *Podoces*, *Cyanopica*, and *Garrulus* are four well-known forms of Palæarctic CORVIDÆ.

But the most magnificent group of the Palæarctic Ornis is certainly the PHASIANIDÆ, which is highly developed all through its central portion. Many of the more splendid Game-birds belong, it is true, to the Oriental Region; but at least five or six of the most remarkable genera are exclusively Palæarctic. Such, for example, are *Crossoptilon*, *Lophophorus*, *Pucrasia*, *Phasianus*, *Thaumalea*, and *Ithaginis*. Thus, I think, on the whole, we may put down the four families SYLVIIDÆ, FRINGILLIDÆ, CORVIDÆ, and PHASIANIDÆ as specially typical of the Palæarctic Ornis. As I shall show further on, several other forms (such as *Loxia*, *Sitta*, *Ampelis*, *Tetrao*, *Bonasa*, *Lagopus*, and several genera of ANATIDÆ) are common to the Palearctic and Nearctic Regions, but are not found elsewhere.

(c) *Subregions*.—Mr. Wallace has divided the Palæarctic Region into four subregions—the European, Mediterranean, Siberian, and Mantchurian. The subject is a difficult one to handle satisfactorily; but it seems to me that the seven subregions which I proposed in my address to the Biological Section of the British Association at Bristol in 1875 (5) are more convenient, though it is of course quite impossible to separate such land-districts by definite lines, except in cases where a marine area intervenes. These seven subregions are:—

1. *The European Subregion*, containing Europe and Iceland.
2. *The Cisatlantean Subregion*, embracing all that part of the Palæarctic Region lying south of the Mediterranean Sea, together with the Atlantic Islands.
3. *The Siberian Subregion*, embracing the whole of Northern Asia.
4. *The Mantchurian Subregion*, containing Northern China, the adjoining part of Mongolia, and the northern islands of Japan.
5. *The Japanese Subregion*, embracing the southern Japanese Islands.
6. *The Tartarian Subregion*, containing the great central plateau of Central Asia.
7. *The Persian Subregion*, embracing Persia, Asia Minor, and Syria.

I will now say a few words upon the principal characteristics of each of these subregions, and upon some of the leading recent authorities upon their birds. These authorities will be mostly those subsequent in point of date to the delivery of my address on Geographical Zoology of 1875, in which most of the principal works of reference upon the subject issued up to that date were specially referred to.

1. *The European Subregion.*

As regards authorities on the birds of the European Subregion, there can be no question, I think, that Mr. Dresser's 'History of the Birds of Europe' (6), completed in 1881, and contained in eight large quarto volumes, holds the first

place, and is likely to do so for a considerable period. It would be easy to criticize it from many points of view; but the long series of life-like and artistic figures which it gives us will not be easily matched, and the letterpress is a veritable mine of information, upon the basis of which a new handbook of Western Palearctic Ornithology might well be built. I commend this subject to some of the younger members of the present Congress, who may find leisure to undertake such a task.

Prof. Newton's valuable edition of Yarrell's 'British Birds' (7), which I spoke of as in progress in my British Association Address, has been finished by Mr. Howard Saunders, who has also, more recently, issued a most useful manual of the birds of the British Islands (8). A large number of local avifaunas of various parts of Great Britain have also been published of late years, so that each county bids fair before long to have a separate history of its birds. I cannot specify these individually, but I may mention by name, as one of the most valuable, Stevenson's 'Birds of Norfolk' (9), the third and last volume of which has been prepared and issued by Mr. Southwell since the original author's lamented decease*.

On the Continent during the past 15 years no single publication has been issued on the birds of Europe generally which can be placed in the same category as Mr. Dresser's. But an enormous amount of local work has been done, especially in Germany, Italy, Russia, and Scandinavia. We can hardly say the same of France, where of late years the progress of native Ornithology seems to have been almost in abeyance, except for the occasional appearance of a number of M. Olphe-Galliard's "*Contributions à la Faune Ornithologique de l'Europe occidentale*" (11). In Germany great

* As regards British Ornithology, I may also venture to call attention to the 'List of British Birds' (10) published by the British Ornithologists' Union in 1883, and prepared principally with the laudable object of inducing the usage of a uniform nomenclature. This was, I believe, the precursor of a series of corresponding publications subsequently issued in other countries, and had certainly the merit of setting a good example.

influence has been brought to bear upon the local Ornithology of the whole of Central Europe by the institution of the International Ornithological Committee established in 1884, and the publication of its organ 'Ornis' (12), commenced in 1885 and carried on with unfailing regularity.

In Italy two well-known Ornithologists have devoted themselves to the task of summarizing the present state of our knowledge of Italian Ornithology. Count Salvadori, inspired by the 'List of British Birds' of the British Ornithologists' Union, published in 1886 his 'Elenco degli Uccelli Italiani' (13). More recently Prof. Giglioli has issued his 'Avifauna Italica' (14), which contains a large amount of varied information upon the same subject.

In Russia, as may be naturally expected, matters have not yet advanced quite so far. We have as yet no available manual of the Ornithology of European Russia. But we have had several valuable works recently published on the avifauna of various parts of it, amongst which I may specially mention Dr. Gustav Radde's 'Ornis Caucasica' (15) and Herr Th. Pleske's excellent memoir on the birds of the Kola Peninsula (16). I may also call attention to the same author's 'Ornithographia Rossica' (16*a*), of which three numbers have already appeared. The somewhat ambitious programme of this work is to give an account of the birds of the whole Russian Empire, so that when finished it will form a most valuable addition to our knowledge of Palæ-arctic Ornithology.

In Scandinavia there has been no very recent general work upon the birds published, although many papers and memoirs have been written upon various portions of the subject. But it is understood that the well-known zoologist of Christiania, Prof. Collett, has for many years been working hard upon the birds of Norway, and we may trust that before long he will bring his labours to a conclusion.

In concluding our review of recent progress in European Ornithology, we may remark that South-western and South-eastern Europe (by which we mean Spain, Portugal, Bulgaria, Greece, and Turkey) have been lately of much use as happy

hunting-grounds to the Ornithologists of Central Europe. But, with the exception of the 'Aves de España' of Don José Arévalo y Baca (17) and Brusina's papers on the Birds of Croatia (18), we have few, if any, recent native works on the Ornithology of these countries to speak of.

2. The Cisatlantean Subregion.

The birds of the Cisatlantean Subregion were mostly included by Mr. Dresser in his great work, and are therefore tolerably well known and correctly figured. The peculiarity of the Cisatlantean Ornis consists in the representation of many familiar species of European birds by more or less modified specific forms. As regards the continental portion of this subregion no general work has appeared of late years, although memoirs in various journals, amongst which we may specify Dr. A. Koenig's excellent article on the Ornithology of Tunis (19), have materially increased our knowledge of this subject. There is also ample room for a work on the insular portion of this subregion: that is, the island groups of the Canaries, Madeira, and the Azores. On the birds of the Canaries we have lately acquired much valuable information from the researches of Mr. Meade-Waldo, Canon Tristram, and Dr. Koenig (20-23), and I trust we may look to one of these naturalists for the preparation of a complete volume on the Canarian Avifauna.

3. The Siberian Subregion.

Since the issue of Radde's 'Reisen im Süden von Ost-Sibirien,' some twenty years ago, the Russian naturalists have given us no general work upon Siberian Ornithology, although much has been done in the way of exploration and investigation. The Museum of the Academy of Natural Sciences of St. Petersburg is believed to contain an unrivalled series of Siberian birds, of which, no doubt, we shall have a good account in Herr Pleske's 'Ornithographia Rossica,' above mentioned.

4. The Mantchurian Subregion.

It is a very difficult question to decide where to draw the

line between the Mantchurian Subregion and the adjacent northern part of the Oriental Region, to which Southern China should probably be referred. But as the greater part of the Chinese Empire must be referred to the Mantchurian Subregion, we must mention under this head David and Oustalet's '*Oiseaux de la Chine*' (24), which furnishes us with a complete *résumé* of Chinese Ornithology. It embraces descriptions of nearly 800 species, and the atlas of plates which accompanies it, if not of first-rate artistic merit, is most useful to the student. Since the lamented death of Swinhoe, the pioneer of Chinese Ornithology in its modern sense, and the publication of the above-named work, there has been a slight lull in the progress of our knowledge of Chinese Ornithology. But several English Ornithologists, amongst whom we may mention Messrs. Seebohm, Slater, and Styan (25-27), have recently taken up the subject, in which, indeed, there is ample room for a large number of investigators.

5. *The Japanese Subregion.*

As regards Japan I shall content myself on the present occasion by calling attention to Mr. Seebohm's '*Birds of the Japanese Empire*' (28), issued last year, which gives a capital summary of this subject in a compact and handy form. It is hard to please everybody, and a rival Ornithologist on the other side of the Atlantic has found much fault with Mr. Seebohm's unpretending volume. I venture, however, to give my opinion that its defects are far overbalanced by its obvious merits, although no doubt more complete descriptions of the species and a more ample synonymy would have added much to the value of the work. Mr. Seebohm is now extending his researches to the little-known island-groups of the Japanese Empire, where there remain many discoveries to be made (29).

6. *The Tartarian Subregion.*

Of this district, which embraces the great interior high plateau of Central Asia, the illustrious travellers Prjevalsky

and Severtzoff have been the principal explorers of modern days. Prjevalsky was an ardent ornithologist and made splendid collections of birds, which are now at St. Petersburg. We have as yet had but fragmentary notices of them. But, by the aid of a subsidy from a member of the Imperial family, a complete account of the valuable zoological results of Prjevalsky's various expeditions has now been planned and commenced. The portion relating to the birds (30) is being prepared by Herr Th. Pleske, who is in charge of the bird-collection belonging to the Imperial Academy of Sciences, and whom I have already mentioned as the author of '*Ornithographia Rossica*.'

Another great Russian traveller and ornithologist, Severtzoff, has likewise died in the middle of his work. In his case also means have been found to commence the publication of the accumulated results of his many journeys in Central Asia. Dr. Menzbier's '*Ornithologie du Turkestan*' (31) is based mainly upon Severtzoff's collections, and when completed will vastly increase our knowledge of the avifauna of the Tartarian Subregion.

7. The Persian Subregion.

In my address to the British Association I mentioned the approaching issue of Mr. Blanford's '*Zoology of Eastern Persia*' (32). This work, which forms the second volume of the account of the journeys of the Persian Boundary Commission of 1870-72, was issued in 1876, and contains an excellent treatise upon Persian Ornithology, with good illustrations of the more remarkable species. Since that period no great additions have been made to our knowledge of the birds of Central Persia. But an excellent observer on the Persian coast, Mr. W. D. Cumming, has recently forwarded a valuable series to the British Museum, of which Dr. Sharpe has given us an account (33-35). Dr. Radde's excursion along the northern frontiers of Persia (36, 37) has likewise materially added to our knowledge of the birds of the Persian Subregion.

II.—THE ETHIOPIAN REGION (*Regio Æthiopica*).

(a) *Extent*.—Africa south of the Atlas, Madagascar and the Mascarene Islands, and Arabia up to the Persian Gulf.

(b) *Characteristic Forms*.—As regards its birds, the Ethiopian Region is much more strongly marked off from the contiguous lands than the Palæarctic. It has at least five distinct families of birds, absolutely confined to it, besides a large series of peculiar genera. The *Musophagidæ*, the *Coliidae*, the *Irrisoridæ*, the *Serpentariidæ*, and the *Struthionidæ* are characteristic families of Ethiopian birds which are not met with at all outside the limits of this region. Besides these, two others, the *Leptosomidæ* and *Mesitidæ*, are, now-a-days at least, restricted to Madagascar.

The genera confined to the Ethiopian Region, but not belonging to the families above mentioned, are also very numerous. Amongst the Passeres they will be found principally among the *Muscicapidæ*, the *Laniidæ*, the *Sturnidæ*, and the *Ploceidæ*. Africa has also many genera of Barbets (*Megalæmidæ*), Hornbills (*Bucerotidæ*), and Goatsuckers (*Caprimulgidæ*) restricted to it. The Guinea-fowls (*Numida* and its allies) constitute the characteristic gallinaceous form of the Ethiopian Region, but Francolins (*Francolinus* and *Pternestes*) are likewise very abundant throughout its area. Two well-marked forms of Herodiones (*Balæniceps* and *Scopus*) are likewise absolutely confined within Ethiopian limits.

(c) *Subregions*.—Madagascar and the Mascarene Islands are so very different from the rest of the Ethiopian Region, in its present stage, that it is almost a question whether they ought not to constitute, as regards birds, a region by themselves. In my British Association Address I have spoken of them as the "Lemurian Subregion," however, and I will follow the same plan on the present occasion. The rest of the Ethiopian Region may be divided, for convenience' sake, into the following six subdivisions:—

1. *Western Africa*, from the Senegal to the Congo.
2. *South-western Africa*, or Angola and Benguela.

3. *South Africa*, i.e., the Cape Colony and adjoining districts.

4. *South-eastern Africa*, from the Zambezi up to the Somali coast.

5. *North-eastern Africa*, including Abyssinia, Nubia, and Egypt.

6. *Arabia*.

I will take these districts in order and say a few words upon the recent advance that has been effected in each of them as regards our knowledge of its birds.

In Western Africa, commonly so-called, although great progress has been made and many contributions have appeared of late years, amongst which especial mention should be made of Heer Büttikofer's excellent account of the Birds of Liberia (38), no general work on its ornithology has been published since Hartlaub's 'System' in 1857.

In South-western Africa we are more fortunate. Prof. J. V. Barboza du Bocage has completed the volume on the Ornithology of Angola (39), which I spoke of as in preparation in my "Address," and it was published at Lisbon in 1881. It gives us an account of 673 species, to which, however, further additions have since been made by the author himself and his fellow-workers in the Lisbon Museum. We have also several excellent papers by Mr. Büttikofer upon the collections made by Mr. van der Kellen in this district (39*a*–39*c*), and Dr. Reichenow's account of the collections made by Dr. Falkenstein on the Loango coast (39*d*).

As regards the Cape Colony and the adjoining territories, which embrace nearly the whole of what we call "South Africa," a more complete work on the birds is also now available. This is Dr. Bowdler Sharpe's new edition of Layard's 'Birds of South Africa' (40), which, though commenced in 1875, was not finally completed till 1884. Dr. Sharpe has wisely included in his work all species known to him to occur south of the Zambezi on the east, and of the Quanza on the west. This has largely increased the number of South-African birds given in Layard's original work and raised it to no less than 771 species.

Passing on to the north of the Zambezi to the division proposed to be called "South-eastern Africa," we shall find that great progress has been made as regards our knowledge of its birds during the past fifteen years. Peters's long-promised volume on the birds of Mozambique was, it is true, never published, but several more recent German explorers in South-eastern Africa (Böhm, Hildebrandt, Fischer, Stuhlmann, Emin Pasha) have stored the rich bird-collection of their Fatherland with series of specimens from the interior of this district, and many valuable papers have been based upon them (41-47).

Several English collectors (Lort Phillips, Johnston, Hunter) have also been busily engaged in the same country and on the adjoining coast of Somaliland (48-50), and, judging by the fine series which has only recently reached England from Mr. Jackson (51), the riches of this avifauna are by no means yet exhausted.

In North-eastern Africa, commonly so-called—that is, Abyssinia, Nubia, and Egypt—comparatively little has been done since the issue of the works mentioned in my British Association "Address." We must not, however, forget to mention Count Salvadori's excellent memoirs on the birds of Shoa (52, 53), based upon the collections made by the Italian expeditions to this part of Abyssinia.

Little also has been done as regards the avifauna of Arabia, where there seems to be still room for ornithological discoveries to be made. But the adjacent island of Socotra, which belongs to this subdivision, was zoologically explored by Prof. I. B. Balfour in 1880, and as regards its birds the results are given in Dr. Hartlaub's paper published in the Zoological Society's 'Proceedings' for 1881 (54).

7. *Lemurian Subregion.*

As I have already said above, it is somewhat doubtful whether, except for convenience' sake, the Lemurian Subregion can be properly annexed to the Ethiopian Region. There can be no doubt of the highly specialized character of its birds, and some modern authorities consider that, as

regards the general facies of its avifauna, it has more to do with the Oriental Region than with the Ethiopian. But, as Mr. Wallace has argued in his 'Island Life,' the presence of certain eastern genera in Madagascar does not outweigh the greater number of African types also met with in this island. In Madagascar, in fact, we have probably a relic of the ancient fauna of the Ethiopian Region, before it was invaded by hosts of intruding strangers from the north.

I think it unnecessary on the present occasion to go further into the question of Madagascar Ornithology and its peculiarities. The excellent volumes of MM. Milne-Edwards and Grandidier, which form a part of the latter gentleman's great work upon Madagascar (55), give us full particulars as to the birds of this country and a series of splendid illustrations. It appears that about 238 species of birds are now known to occur in Madagascar, and that not less than 35 of the genera and 129 of the species are peculiar to it. This is an amount of individuality which is certainly not attained by any other known avifauna of a similar extent.

III.—THE ORIENTAL REGION (*Regio Orientalis*).

(a) *Extent*.—Southern Persia, India south of the Himalayas, Burmah, Siam, Southern China, and the East-Indian Islands down to Celebes and Wallace's line.

(b) *Characteristic Forms*.—The ornithic forms characteristic of the Oriental Region are not so isolated as those of the Ethiopian Region, but they are very numerous and very varied. Amongst the Passeres the *Eurylemidæ* form a distinct family entirely confined to the Oriental Region; the *Pittidæ* are likewise most highly developed within its limits, but have a few scattered representatives in the Ethiopian and Australian Regions. Other Passerine families which are likewise characteristic of the Oriental Region, although not absolutely confined to it, are the *Timeliidæ*, *Pycnonotidæ*, *Dicruridæ*, and *Nectariniidæ*. The genera *Acridotheres*, *Gracula*, *Phyllornis*, and *Pericrocotus* are also restricted to the Oriental Region. Passing to the

Picarian birds, we find the Trogons of the genus *Harpactes*, the Bee-eaters of the genus *Nyctiornis*, and several genera of Cuckoos (*Phænicophaus*, *Dasylophus*, &c.) restricted to the Oriental Region, and among the Parrots the genera *Palæornis* and *Loriculus*. Some of the most highly developed forms of the *Gallinæ* are likewise only met with within the limits of the Oriental Region: amongst these we may mention *Pavo*, *Cerionis*, *Polyplectron*, *Argus*, *Euplocamus*, and *Rollulus*.

(c) *Subregions*.—There is no part of the world where more attention has been paid to ornithology and greater progress made in advancing it during the past fifteen years than in the various parts of the Oriental Region. But the question of its division into subregions is still a very difficult one, and I am not prepared to enter into it on the present occasion. In commenting, however, upon some of the principal recent authorities for our knowledge of its birds, I will speak of the Oriental Region under the subjoined heads:—

1. *The Indian Peninsula and Ceylon.*
2. *The Burmese Countries and Malay Peninsula.*
3. *The Sunda Islands and adjoining islands down to Wallace's line.*
4. *Celebes.*
5. *The Philippine Archipelago.*

1. *The Indian Peninsula and Ceylon.*

In 1875, at the time I read the "British Association Address," Jerdon's 'Birds of India,' published in 1864, was the only book of reference for the Indian Ornithologist, and I insisted loudly on the absolute necessity of a new one. Although since that period students of birds have been numerous in every part of the Peninsula, mainly under the impetus given to the good work by Mr. Allan Hume, C.B., and his periodical 'Stray Feathers' (56), it is only quite recently that the grand necessity of a new Handbook has been supplied, and even now this much desired work is not complete.

After much solicitation and pressure the Secretary of State for India was induced to authorize the publication of a series of Handbooks on the Fauna of British India, under the very efficient editorship of Mr. W. T. Blanford, F.R.S. To Mr. E. W. Oates, than whom no more competent person could have been selected, was assigned the task of preparing the Handbook of Birds, and the first two volumes of it have been duly issued (57). But I regret to have to say that instead of being allowed to complete this most valuable piece of work, Mr. Oates has been hurried back to his ordinary duties in Burmah by the Indian authorities. It is, however, some consolation to be able to add that Mr. Blanford has himself undertaken to prepare the remaining volume upon the Indian Birds.

Mr. Oates's revision of the Indian Ornis has been mainly based upon the enormous mass of specimens accumulated by Mr. Allan Hume, C.B., who in 1888 presented the whole of his magnificent bird-collections to the British Museum, where, when joined to the previous collections of Hodgson, Sykes, Tweeddale, and other well-known authorities, they form an unrivalled series. Simultaneously with the Handbook, Mr. Oates has prepared and issued a new edition of Mr. Hume's valuable 'Notes on the Nests and Eggs of Indian Birds' (58), which, I am happy to say, he has found time to finish before his departure to India. Furnished with these two works, and by means of the references given in them, the student of the Indian Ornis will find himself better off for information than, perhaps, in any other part of the world, except Europe and the United States.

2. The Burmese Countries and Malay Peninsula.

In this division of the Oriental Region we have also a recent and valuable guide to the Ornis, likewise from the pen of Mr. Oates, published in 1883 (59). Since this date British Burmah has received a huge extension by the annexation of what was at that period Independent Burmah, and when this is fully explored many additions to the avifauna of Burmah may be expected. An enterprising Italian naturalist,

Signor Fea, has recently made fine collections in parts of Burmah for the Museo Civico, Genoa. Of these Count Salvadori has given us an excellent account (60). At the extremity of the Malay Peninsula an active ornithologist, Mr. Davison, has lately been established at Singapore as Curator of the Raffles Museum, and is understood to be working hard upon the ornithology of the British and Protected States of the Peninsula. In Siam, Annam, and Tonquin, not so much has been done of late years. The French National Museum has received many collections from those countries, and the discovery of some fine new forms (such as *Rheinardius ocellatus*) has been the result, but we have as yet no connected account of the ornithology of these States, and we must look to M. Oustalet to supply this want.

3. The Sunda Islands.

Great advance has been made in our knowledge of the birds of the East-Indian Archipelago during the last fifteen years, and nearly all the larger of its component islands have been frequently visited and explored. Of the birds of the great Island of Borneo, Count Salvadori published an excellent systematic catalogue in 1874 (61), based mainly upon the collections of Doria and Beccari. Considerable additions, however, have been made to the Bornean Ornis since that period, amongst which we must call special attention to the splendid series obtained on Mount Kina Balu and in the adjacent districts by Mr. J. Whitehead in 1885-87. This series, which has been fully described by Dr. Bowdler Sharpe in 'The Ibis' for 1889 and 1890 (62), embraces examples of no less than 228 species. Dr. W. Blasius has also described (63) the collection made by Herr Grabowsky in South-eastern Borneo, and has given us a *résumé* of recent papers on this subject.

In the adjacent islands of Sumatra and Java no such superlatively good work has lately been effected. But Sumatra has been recently visited by ornithologists of several different nations, amongst whom we may specially mention

Buxton (64), Beccari (65), Bock (66), Forbes (67), and Klaasi (67 *a*), and we have been furnished with excellent accounts of the collections made by these explorers. To the Ornithology of Java, which requires special attention on account of the somewhat peculiar phasis of its Bird-life, Heer A. G. Vorderman, of Batavia, has lately devoted himself (68). He enumerates 404 species of Javan birds, and promises a complete work on the subject.

4. *Celebes.*

The Avifauna of Celebes, a debatable land between the Oriental and Australian Regions, but more properly attributable to the former, was at one time the special subject of study of Arthur, Lord Tweeddale, formerly President of the Zoological Society of London. Since his lamented death the subject has been taken up by Dr. A. B. Meyer (69), Count Salvadori (70), Brüggemann (71), and Dr. W. Blasius (72), and we have become well acquainted with the birds of this island.

5. *The Philippine Archipelago.*

As in Celebes so in the Philippines, Lord Tweeddale's 'Memoir on the Birds of the Philippine Archipelago' (73), published in 1875, has been the base of all modern researches upon this subject. This specially attractive avifauna has of late years received great attention. In 1874 Dr. J. B. Steere made a successful expedition to the Philippines, and added more than sixty species to their avifauna, besides discovering some remarkable new forms (74). Since that period Major Wardlaw Ramsay (75, 76) has published several contributions to the same subject, and within the last few years Dr. Steere has made a second expedition to the group, and formed extensive collections in most of the islands. Of the results of this last expedition we have as yet but an imperfect account (77), but we may trust that the deficiency will be made good so soon as Dr. Steere has recovered his health and strength.

IV.—THE AUSTRALIAN REGION (*Regio Australiana*).

(a) *Extent*.—New Guinea and the Moluccas, and adjacent islands up to Wallace's line, Australia, Tasmania, New Zealand, and the Pacific Islands.

(b) *Characteristic Forms*.—The Australian Region is, as is universally allowed, better characterized by distinct forms of animal life than any other region of the earth's surface. As regards Mammals this is certainly the case, but in the Class of Birds perhaps it is a question whether the Neotropical Region is not even more distinct. Be this as it may, it is easy to point out the principal types of bird-life that characterize the Australian Region, and I will proceed to do so in a few words.

In the first place, the *Paradiseidae*, the *Menuridae*, the *Atrichidae*, and the *Casuariidae* are four families absolutely confined to the Australian Region. Besides these, two well-marked groups of Parrots—the *Trichoglossidae* and the *Cacatuidae*—are essentially Australian, and only occur exceptionally outside the limits of that region. The same may be said of the *Meliphagidae* and the *Megapodiidae*, of both of which families only slightly intruding representatives are found within the Oriental Region.

As Mr. Wallace has well pointed out, of all these families the Honey-suckers (*Meliphagidae*) are peculiarly characteristic of the Australian Ornithis. The family abounds in genera and species, and extends over the whole region, including the Pacific Islands. Only one single species of it has yet been met with outside of the limits of the Australian Region.

(c) *Subregions*.—Compared with Australia the mainland of New Guinea and the adjacent islands form a distinct and well-marked subregion, which has many peculiar types of its own. As examples of these we may mention *Amblyornis*, *Melanopyrrhus*, *Peltops*, *Rectes*, *Manucodia*, *Paradisea*, *Asstrapia*, *Gymnocorvus*, *Nasiterna*, and others. New Zealand has also many distinct ornithic types, such as *Neomorpha*, *Prothemadera*, *Anthornis*, *Acanthisitta*, *Mohoa*, *Certhiparus*, *Turnagra*, *Creadion*, *Nestor*, *Strigops*, and *Apteryx*, and

must be kept separate ; while the Pacific Islands, after excluding the Solomon group, which are outliers of the Papuan Subregion, constitute a fourth division ; and the Sandwich Islands, which seem to be quite different from the South Pacific group, a fifth.

I will therefore speak of the Australian Region, and the work that has recently been done in it, under five heads. These will be :—

1. *The Papuan Subregion.*
2. *The Australian Subregion.*
3. *The Maorian Subregion.*
4. *The Pacific Subregion.*
5. *The Hawaiian Subregion.*

1. *The Papuan Subregion.*

An enormous advance has been made in our knowledge of the avifauna of this subregion since the date of my “British Association Address.” Not only have active and enterprising naturalists and collectors ransacked many parts of it, but the whole information amassed by them has been brought together and put into uniform shape in Count Salvadori’s excellent ‘Ornitologia della Papuasias e delle Molucche’ (78). This accurate and comprehensive treatise, which was published at Turin in three volumes in 1880–82, is certainly one of the best executed and most meritorious ornithological works of the present period, and has raised its author to the rank of one of the most prominent writers upon modern ornithology. Reckoning the addenda appended to the third volume, it gives us an account of no less than 1028 species, and shows us that the Papuan Avifauna is not only remarkable in its character, but also numerically one of the most extensive on the earth’s surface. Moreover, Count Salvadori has not closed his labours upon this subject, but has already issued two parts of a supplement (79), in which are recorded the additions made to the ornithology of the Papuan Subregion since the original work was concluded.

The only remaining work on this subject to which I think it necessary to call attention on the present occasion is Gould's 'Birds of New Guinea' (80). Left incomplete by its author at the time of his death, this splendid series of illustrations was brought to a conclusion in 1888 by Dr. R. Bowdler Sharpe. It is, of course, of enormous value as furnishing us with a series of accurate figures of about 300 species of Papuan birds, but in point of scientific merit must yield the palm to Salvadori's more complete publication.

2. The Australian Subregion.

Gould's 'Birds of Australia' (81) and the Supplement thereto, published in 1869 (82), are still our principal authority on the birds of this subregion, and are likely to long remain so. Slight additions are continually being made to the Australian list, principally by Mr. E. P. Ramsay, of the Australian Museum, Sydney, and other local workers on the Australian Ornis. Mr. Ramsay's 'Tabular List of Australian Birds' (83), published in 1888, enumerates 760 species, showing in all 88 additions to those recognized by Gould in his 'Handbook.'

3. The Maorian Subregion.

Of the peculiar ornis of New Zealand we are fortunate in having an excellent account in the second edition of Sir W. L. Buller's 'History of the Birds of New Zealand' (84), recently completed in two volumes. In this elaborate work we have not only full particulars of every species of New-Zealand bird, but also life-like illustrations of them prepared by one of our leading ornithological artists. I do not say that the subject is absolutely exhausted, but it will be difficult indeed just at present to make any considerable additions to it.

4. The Pacific Subregion.

Many stray papers have been published on the birds of the Pacific Islands during the past fifteen years, but except

Mr. Layard's excellent essay on the birds of New Caledonia (85), little has been done to reduce our knowledge of this subject into order. Mr. Seebohm, however, has recently turned his attention to this subject, and having acquired the whole of the Messrs. Layard's extensive collection, has a good basis to work upon, which will no doubt result in a valuable work upon the Pacific Avifauna.

5. *The Hawaiian Subregion.*

As I have shown in an essay upon the birds of the Sandwich Islands, published in 'The Ibis' for 1871 (86), the Hawaiian Avifauna is so peculiar in its character that it must necessarily be referred to a division separate from the rest of the Pacific Islands. During the past twenty years our knowledge of this subject has made great advances, and Mr. Scott Wilson's recent expedition to the Sandwich Islands has vastly increased it. Mr. Wilson's first number of the 'Aves Hawaiienses' (87) has already been issued, and the work when completed bids fair to give us an excellent and accurate account of all that is yet known of the birds of the Hawaiian Subregion.

V.—THE NEARCTIC REGION (*Regio Nearctica*).

(a) *Extent*.—America down to Southern Mexico, and Greenland.

(b) *Characteristic Forms*.—Many writers on zoo-geography have treated the Nearctic Region as merely a piece of the Palearctic, and there are, no doubt, grounds upon which this view may be supported. But as I have always maintained, and as has been fully shown by Mr. Wallace, the Nearctic Region, "although somewhat deficient in the total number of its families, possesses a full proportion of peculiar and characteristic family and generic forms," and may therefore justly as well as conveniently be allowed full rank as a Region. In this Region the Palearctic element is certainly strong, but its avifauna has been greatly modified by the

incursion of numerous forms from the Neotropical Region, and it has moreover many well-marked independent forms (such as *Chamaea*, *Gymnocitta*, and nearly all the *Mniotiltidæ*) present in it, of which the origin is slightly obscure. Mr. Wallace, in the second volume of his 'Geographical Distribution,' has given us a list of no less than 47 typical Nearctic genera of land-birds, while the number of genera which may be regarded as common to the Nearctic and Palæarctic Regions is only 22. These and other facts urged by Mr. Wallace fully establish the claim of temperate North America to be regarded as a Region apart, distinct alike from the Palæarctic on the one side and the Neotropical on the other.

(c) *Subregions*.—There is still much uncertainty as to the best mode of dividing up the Nearctic Region into smaller areas. American naturalists have hitherto usually accepted three provinces as belonging to this region—an Eastern, Central, and Western. Dr. Merriam, however, who has recently studied the subject (88), claims to be able to show that there are but two primary life-areas in the Nearctic Region—a northern (Boreal) and a southern (Subtropical), and that the former views must consequently be abandoned. It remains still to see whether Dr. Merriam's proposed reform will be accepted by his brother workers in the United States.

The standard work upon Nearctic Ornithology is that of Baird, Brewer, and Ridgway (89), of which the three volumes containing the land-birds were published in 1874. The two volumes containing the water-birds (90) were not issued until ten years later. But as regards nomenclature and for ordinary purposes of reference the American ornithologists now employ the 'Check-list of North-American Birds,' published by the American Ornithologists' Union in 1886 (91), together with a supplement of 1889 (92). It is hardly necessary upon the present occasion to criticize the principles of nomenclature upon which the well-known 'Check-list' has been based, and which have led to results rather distasteful to many European ornithologists. I may, however, I hope without offence, say that in my opinion the

revolutionary change made by commencing the catalogue with the lowest birds instead of the highest, and thus reversing the ordinary plan of arrangement, was both unnecessary and inconvenient. I may further add that, though I am of opinion that subspecies undoubtedly exist in nature, and although I agree that the best way of designating them is by the use of trinomials, I cannot but think that our American fellow-workers are moving on a little too fast in this matter. Hardly a month now elapses without the receipt in Europe of "advance sheets" and "authors' editions" of papers containing descriptions of new subspecies of North-American birds, and it appears to be very questionable whether these are always based upon sufficient characters. Even subspecies ought to be made practically recognizable. Nearly all species spread over an extensive area vary at their extreme limits from the central form; but these variations may be so slight as not to necessitate separation even as subspecies.

The total number of species of birds recognized in the last edition of the 'Check-list,' that of 1889, is 768. We may therefore reckon about 800 species as the limit of the number of those met with in the Nearctic Region, which thus probably has the poorest avifauna, numerically, of all the six primary Regions.

VI.—THE NEOTROPICAL REGION (*Regio Neotropica*).

(a) *Extent*.—South America, Central America up to Southern Mexico, and the Antilles.

(b) *Characteristic Forms*.—As regards its bird-life, the Neotropical Region is pre-eminently well marked, and has, in fact, a greater number of well-defined families of birds peculiar to it than any of the other five regions. It has also probably a greater number of species met with within its area than any other part of the world's surface. The following 23 families of birds are entirely restricted to the Neotropical Region, and are highly characteristic of its ornithology:—

Cœrebidæ.	Buceonidæ.
Oxyrhamphidæ.	Rhamphastidæ.
Pipridæ.	Palamedeidæ.
Cotingidæ.	Cracidæ.
Phytotomidæ.	Opisthocomidæ.
Dendrocolaptidæ.	Eurypygidæ.
Formicariidæ.	Cariamidæ.
Pterotochidæ.	Psophiidæ.
Steatornithidæ.	Thinocoridæ.
Momotidæ.	Tinamidæ.
Todidæ.	Rheidæ.
Galbulidæ.	

Besides these, there are at least four other groups, of full family value, which, though they extend more or less abundantly into the Nearctic Region, are specially characteristic of the Neotropical, in which they probably originated; these are, the *Tanagridæ*, *Icteridæ*, *Trochilidæ*, and *Cathartidæ*. But beyond all other forms of bird-life the *Trochilidæ* are pre-eminently suggestive of the Neotropical Ornis. Of more than 400 known species, about 20 only have yet been registered as occurring within Nearctic limits, and most of these only in the extreme southern portion of that region. In many other families also, and, in the case of the Passeres, in nearly all the families, the Neotropical genera are restricted to the region, so that there can, in short, be no doubt that the Neotropical Avifauna is the most peculiar and the most highly developed of any part of the world's surface.

In the 'Nomenclator Avium Neotropicalium' (93) compiled by Mr. Salvin and myself in 1873 we attributed 3565 species to the Neotropical Ornis. If to these we add the discoveries of the past twenty years it is probable that at least 4000 species of Neotropical birds have already been described, and there is no doubt that many remain in the unexplored recesses of South America to be added to the list. It is probable, in fact, that more than one third of the whole number of species of existing birds are to be met with within the limits of the Neotropical Region.

(c) *Subregions*.—In his great work on Geographical Distri-

bution Mr. Wallace has divided the Neotropical Region into four subregions only. I think, however, that the most natural subdivisions in this region are six in number, which, beginning from the north, should stand as follows :—

1. *The Antillean Subregion*, containing the Antilles or West-India Islands.

2. *The Transpanamanic Subregion*, containing Central America from Southern Mexico to Panama.

3. *The Andean Subregion*, extending from Trinidad and Venezuela along the chain of the Andes, through Colombia, Ecuador, and Peru down to Bolivia.

4. *The Amazonian Subregion*, embracing the whole watershed of the Orinoco and Amazons up to a moderate elevation in the Andes, and including also the high plateau of Guiana.

5. *The South-Brazilian Subregion*, containing the great wood region of South-east Brazil and Paraguay and the adjoining districts.

6. *The Patagonian Subregion*, containing Chili, La Plata, Patagonia, and the Falklands.

It is of course impossible, as in other cases, to assign precise limits to these subregions, but I think it may be shown that each of them has a considerable amount of individuality and a certain number of peculiar types. I will say a few words about recent ornithological progress in the Neotropical Region under each of these heads.

1. *The Antillean Subregion.*

In my "British Association Address" I separated the Antilles into numerous subdivisions, and stated at length what was known of the animals of each of them. As regards the birds at least great progress has been made during the past fifteen years, chiefly through the exertions of Ornithologists of the U.S.A., amongst whom we may particularly mention Mr. G. N. Lawrence, of New York, and Mr. Charles B. Cory, of Boston. Mr. Lawrence carefully worked out the birds collected by Mr. F. A. Ober in Barbuda, Antigua, Guadeloupe, Dominica, Martinique, St. Vincent, and Grenada, and has given excellent accounts of them in the Proceedings of

the U.S. National Museum (91-98). Mr. Cory has published two illustrated volumes on the Birds of Haiti (99) and the Bahamas (100), and has besides prepared a complete catalogue of the Birds of the West Indies (101, 102), of which the last edition was issued in 1889. We may thus assume to have already a pretty good general knowledge of the avifauna of the Antillean Subregion, although it is still necessary that each of the numerous islands should be carefully explored (which is by no means yet the case) before our knowledge of the subregion can be deemed to be anything like perfect.

With a view of contributing towards this desirable result I may add that a joint committee of members of the British Association for the Advancement of Science and of the Royal Society has been formed in London for the purpose of investigating the Zoology and Botany of the West-India Islands, and that several energetic collectors have already been despatched to the scene of action (103, 104).

2. *The Transpanamanic Subregion.*

Enormous progress has been made in our knowledge of the birds of Central America during the past twenty years, and this avifauna has now become one of the best known of the whole Neotropical Region. This result has been mainly obtained by the exertions and enterprise of my friends Mr. O. Salvin and Mr. F. D. Godman, whose names will ever be associated together as the planners and executors of the 'Biologia Centrali-Americana' (105), one of the best-executed and most important natural history works of the present epoch. Of the portion relating to the birds, the first volume (containing the Oscinine Passeres) is already complete, and the second is making rapid progress. The collections made in every part of Central America by experienced collectors for the use of this work have been deposited in the British Museum, so that they will always remain accessible to the scientific student. A supplement, no doubt, will be necessary before the bird-portion of the 'Biologia' is finally concluded, as even now novelties are continually turning up; but we may look forward to the

"Aves" of the 'Biologia,' when completed, as likely to give us an almost perfect account of the Transpanamanic Avifauna.

It may not be necessary to mention numerous smaller contributions to our knowledge of the birds of Central America, but I may say that Mr. G. N. Lawrence, Mr. Ridgway, and other ornithologists of the United States have by no means neglected the subject. Señor J. C. Zeledón has devoted special attention to the birds of his native country, Costa Rica, and by his latest list (106) has shown us that no less than 708 species are already known to him as occurring within the limits of this Republic. Mr. C. C. Nutting has also given us a valuable contribution to our knowledge of the Birds of Nicaragua (107).

3. *The Andean Subregion.*

To trace out the limits of the Andean Subregion with any degree of exactitude would, I fear, be a very difficult task. But it appears to me, nevertheless, that the avifauna of the higher Andean Ranges extending from Trinidad through Venezuela and Colombia into Ecuador, Peru, and Bolivia cannot well be associated with the Amazonian Subregion on the one side or the Transpanamanic on the other. It must, however, be confessed that in some parts of its long extent it assimilates rather to the Transpanamanic district, and in others to the Amazonian.

Of the birds of Venezuela we still lack a connected account, and although many smaller contributions have been made to this subject, much still remains to be done. I can think of no more attractive ground for an enterprising ornithological collector than the mountain-range of the Northern Andes, commencing from above La Guayra and passing through the Andes of Merida and Colombia. Although enormous collections of native-made skins have been received from Bogotá during the last half-century, little information has been acquired about the exact localities and habits of the numerous birds of Colombia, and there is still much to be learnt on this subject. There have been, of course, numerous

memoirs written on various portions of the Colombian Avifauna, amongst which I may mention the excellent series amassed by the late Mr. T. K. Salmon in Antioquia (108), but no such work as a Manual of Colombian Birds has yet been attempted, nor, judging from appearances, is it likely to be under present circumstances. In the adjoining Republic of Ecuador pretty nearly the same state of facts prevails. Matters remain much as they were when I spoke of this district in my "British Association Address," though I must not forget to mention the valuable contribution that has been made of late years to the ornithology of Ecuador by Messrs. Berlepsch and Taczanowski (109).

Passing southwards from Ecuador into Peru, I find myself able to chronicle an advance of extreme interest to the student of the Neotropical Ornis. Taczanowski's 'Ornithology of Peru' (110), commenced in 1884 and finished in 1886, gives us a complete account of the extensive avifauna of that Republic, and registers not less than 1342 species as already met with within its limits. Nor can we doubt that when the numerous valleys of the higher Andes are more thoroughly explored considerable additions will have to be made to this list, although we must recollect that a large portion of Peru belongs more strictly to the Amazonian than to the Andean Subregion. As regards Bolivia, where the Andean fauna may be held to terminate, the principal contribution to its ornithology recently effected is the memoir based by Mr. Salvin and myself on the birds collected in the Bolivian Andes by Buckley (111), in which upwards of 500 species are recorded. I should also not omit to mention Mr. Allen's list of the birds collected in Bolivia by Dr. H. H. Rusby (112), which has added some 130 new species to the Bolivian list.

4. *The Amazonian Subregion.*

The Amazonian Subregion, as I propose to call it, embraces the whole of the enormous basins of the Amazon and the Orinoco, as well as those of the Tocantins and other streams flowing out on the Brazilian coast immediately

to the east of the latter river. It includes within its limits the highlands of Guiana, from which it is probable that a great part of the animal-life of the adjacent lowlands was originally derived. This is shown by the well-known fact that, in the case of different representative species being found in Guiana and South-east Brazil, the Amazonian form is invariably more nearly allied to the Guianan than to the South-east Brazilian representative.

As regards the Amazonian basin generally we have no general work to record as issued during the past fifteen years, except Taczanowski's 'Ornithology of Peru,' already spoken of, which embraces an account of all the species that occur on the Peruvian Amazons. But numerous individual collections are made almost every year in different parts of this extended area, and I may specially mention the names of Mr. Ridgway (113) and Graf v. Berlepsch (114) as having recently made excellent contributions towards our knowledge of this subject.

The highlands of Guiana, on the other hand, have of late years found an efficient explorer in the person of Mr. Henry Whitely, C.M.Z.S., whose large collections have fortunately passed through the hands of Messrs. Salvin and Godman. On these collections Mr. Salvin has based an excellent modern list of the birds of British Guiana, which he has published in 'The Ibis' for 1885 and 1886 (115). In his summary Mr. Salvin has shown that 625 species may be placed in the Guianan list, of which about 60 per cent. are common to the Amazonian Valley. Mr. Salvin further points out that the following fifteen genera of birds, which are found both in Guiana and in Amazonia, do not extend outside the limits of the Amazonian Subregion :—

Xenopipo.	Topaza.
Neopipo.	Urogalba.
Phoenicocercus.	Deroptyus.
Xipholena.	Nothocrax.
Hæmatoderus.	Mitua.
Gymnocephalus.	Opisthocomus.
Gymnoderus.	Psophia.
Rhopoterpe.	

5. *The South-Brazilian Subregion.*

The South-Brazilian Subregion contains the whole of the vast forest-area which occupies the coast-land and adjacent interior of Southern Brazil from the watershed of the Rio San Francisco down to the open prairies of the Rio Grande do Sul, whence Dr. H. von Jhering has recently sent us a very interesting account of the avifauna of its southern limits (116). How far the limits of this subregion should be properly extended into the interior it is not possible to settle accurately until we have a better knowledge of the avifauna of Inner Brazil.

In the South-Brazilian Subregion we have frequent cases of the replacement of Amazonian species by allied but distinct forms. But besides that we also find certain generic types entirely restricted to this subregion. Amongst these I may specify *Cypsnagra* and *Pyrrhocomia* among the Tanagers, *Tijuca*, *Phibalura*, and *Calyptura* among the Cotingas, and *Jamaralcyon* among the Jacamars as evidences of this fact.

The standard works of Prince Max. of Neu-Wied, Burmeister, and Reinhardt, and others referred to in my "British Association Address," still remain our leading authorities on the birds of the South-Brazilian Subregion, and a more modern handbook on the subject is now much required. I could well wish that my excellent friend Count von Berlepsch would undertake this piece of work, for which he is specially qualified by excellent contributions already made to it (117-119) and by his possession of an extensive series of Brazilian birdskins. As regards the Brazilians themselves, it seems that there is little hope of any native talent being attracted to this subject.

6. *The Patagonian Subregion.*

Mr. W. H. Hudson, C.M.Z.S., when resident in Buenos Ayres, made large collections of birds, which he forwarded to England and the United States, and accumulated a series of valuable notes, some of which were published from time to time in the 'Proceedings' of the Zoological Society of London. After Mr. Hudson had settled in this country I

was able to persuade him to revise these notes, and with his assistance to republish them in the work which we called 'Argentine Ornithology' (120). These two volumes contain, I believe, a tolerably complete account of 434 species which we referred to the Argentine Ornis. I can claim little credit to myself for this undertaking, except that of having rescued from oblivion and reduced into systematic form my fellow-worker's excellent field-notes.

As regards the southern portion of the Patagonian Region no great progress has been made of late years, though several publications have appeared which bear more or less upon the subject (121, 122). The same is nearly the case with the Trans-Andean portion of the Patagonian Subregion, which lies mainly within the confines of the Republic of Chili. Here, however, we have a modern list of the birds of Chili, compiled by Mr. H. B. James, F.Z.S. (123). The same gentleman has further shown his interest in Chilian ornithology by employing several collectors, the results of whose work I have had the pleasure of examining. I have thus been enabled to make some contributions towards our knowledge of the previously almost unknown ornis of the Province of Tarapacá (124, 125), which has of late years become a portion of the Chilian Republic.

CONCLUSION.

Having now reviewed the principal additions that have been made to the literature of Geographical Ornithology since I performed the same task in my Address to the British Association at Bristol in 1875, I hope that my fellow-workers in ornithology will allow me to offer a few remarks upon what I consider to be the special requirements in this branch of our science most pressing at the present moment. Where so much remains to be done it is of course difficult to make a satisfactory selection, but I venture to point out the following seven pieces of work as specially calling for attention :—

1. A new handbook of the birds of Europe or the Western

Palearctic Region, brought up to the latest date, and not too bulky in size.

2. A complete list of the birds of the Continent of Africa, south of the Sahara, with indications of their localities, something after the fashion of the 'Nomenclator Avium Neotropicalium.'

This would assist us to obtain a better idea of the extent of the Ethiopian Avifauna than we at present possess, and perhaps enable us to mark out the different subregions more correctly.

3. A synopsis of the birds of the Sunda Islands and other islands of the Malay Archipelago down to Wallace's line.

This would make a good supplement to our knowledge of the Oriental Ornis, which has been so far advanced by recent works on the birds of India and Burmah.

4. A list of the birds of Siam and Cochin, which is much wanted to extend our knowledge of the continental portion of the Oriental Region, and might, I suppose, be easily compiled from the specimens in the Paris Museum.

5. A modern work on the birds of the South Pacific Islands, or what I have called the Pacific Subregion.

This, however, if I understand rightly, is a task which Mr. Seeböhm has already taken in hand.

6. A revised list of the birds of the United States of Colombia, where one of the richest avifaunas of the world's surface still remains un-catalogued.

7. A volume on the birds of Chili and Patagonia, which, taken in conjunction with 'Argentine Ornithology,' would tend to perfect our knowledge of the avifauna of the Patagonian Subregion.

APPENDIX.

Titles of the principal Publications referred to.

- (1) On the general Geographical Distribution of the Members of the Class "Aves." By Philip Lutley Sclater, Esq., M.A., F.L.S. Journ. Linn. Soc. Lond., Zool. vol. ii. pp. 130-145 (1858).
- (2) Die Begrenzung zoo-geographischer Regionen vom ornithologischen Standpunkt. Von Dr. A. Reichenow. Zool. Jahrb. (*Syst.*) iii. p. 671.

- (3) *The Geographical Distribution of Animals.* By Alfred Russel Wallace. 2 vols. 8vo. London, 1876.
- (4) *On the Classification and Distribution of the *Alectoromorphæ* and *Heteromorphæ*.* By T. H. Huxley, F.R.S., V.P.Z.S., &c. P.Z.S. 1868, p. 294.
- (5) *On the present State of our Knowledge of Geographical Zoology.* Address delivered to the Biological Section of the British Association. Bristol, August 25, 1875. By P. L. Selater, M.A., Ph.D., F.R.S., F.L.S., President of the Section.
- (6) *A History of the Birds of Europe, including all the species inhabiting the Western Palearctic Region.* By H. E. Dresser, F.L.S., F.Z.S., &c. 8 vols. 4to. London, 1871-81.
- (7) *A History of British Birds.* By William Yarrell, V.P.L.S., F.Z.S. Fourth edition. 4 vols. Revised and enlarged. Vols. 1, 2, by Alfred Newton, M.A., F.R.S. Vols. 3, 4, by Howard Saunders, F.L.S., F.Z.S., &c. 8vo. London, 1871-85.
- (8) *An Illustrated Manual of British Birds.* By Howard Saunders, F.L.S., F.Z.S. 8vo. London, 1889.
- (9) *The Birds of Norfolk, with remarks on their habits, migration, and local distribution.* By Henry Stevenson, F.L.S., M.B.O.U. Continued by Thomas Southwell, F.Z.S., M.B.O.U. 3 vols. 8vo. London and Norwich, 1866-90.
- (10) *A List of British Birds, compiled by a Committee of the British Ornithologists' Union.* 8vo. London, 1883.
- (11) *Contributions à la Faune Ornithologique de l'Europe Occidentale.* Par Léon Olphe-Galliard. 8vo. Lyon, Berlin, and Bayonne, 1884-90. [In progress.]
- (12) *Ornis. Internationale Zeitschrift für die gesammte Ornithologie.* Herausgegeben von Dr. R. Blasius und Dr. G. v. Hayek. Vols. i.-vi. 8vo. Wien, 1885-90.
- (13) *Elenco degli Uccelli Italiani, compilato da Tommaso Salvadori.* Ann. Mus. Civ. Stor. Nat. Genova, ser. 2, vol. iii. pp. 5-331 (1886).
- (14) *Avifauna Italica. Elenco delle Specie di Uccelli stazionarie o di passaggio in Italia, compilato dal Dottore Enrico Hillyer Giglioli.* 8vo. Firenze, 1886-90.
- (15) *Ornis Caucasica. Die Vogelwelt des Kaukasus systematisch und biologisch-geographisch beschrieben von Dr. Gustav Radde.* 4to. Kassel, 1884.
- (16) *Uebersicht der Säugethiere und Vögel der Kola-halbinsel.* Von Theodor Pleske. St. Petersburg, 1886.
- (16a) *Ornithographia Rossica. Die Vogelfauna des Russischen Reichs, von Th. Pleske. Band ii. Lief. 1-3. Small folio. St. Pétersbourg, 1889-90.* [In Russian and German.]
- (17) *Aves de España.* Por D. José Arévalo y Baca. Madrid, 1887.

- (18) List of the Birds of Croatia. (In Slavonic.) By S. Brusina. Agram, 1890.
- (19) Avifauna von Tunis. Von Dr. A. Koenig. J. f. O. 1888, pp. 121-298.
- (20) Notes on some Birds from the Canary Islands. By E. G. Meade-Waldo. Ibis, 1889, pp. 1-13.
- (21) Further Notes on the Birds of the Canary Islands. By E. G. Meade-Waldo. Ibis, 1889, pp. 503-520, and 1890, pp. 429-438.
- (22) Ornithological Notes on the Island of Gran Canaria. By H. B. Tristram, D.D., F.R.S. Ibis, 1889, pp. 13-32.
- (23) Ornithologische Forschungsergebnisse einer Reise nach Madeira und den Canarischen Inseln. Von Dr. A. Koenig. J. f. O. 1890, p. 257.
- (24) Les Oiseaux de la Chine. Par M. l'Abbé Armand David, M.C., et M. E. Oustalet. 2 vols. Royal 8vo. Paris, 1877.
- (25) On new or little-known Birds from South-eastern China. By Henry Seebohm, F.Z.S. P. Z. S. 1890, pp. 341-345.
- (26) On some Birds from South-eastern China. By Henry H. Slater. Ibis, 1891, p. 41.
- (27) On the Birds of the Lower Yang-tze Basin. By F. W. Styan. Ibis, 1891.
- (28) The Birds of the Japanese Empire. By Henry Seebohm. Royal 8vo. London, 1890.
- (29) On the Birds of the Bonin Islands. By Henry Seebohm. Ibis, 1890, p. 95.
- (30) Wissenschaftliche Resultate der von N. M. Przewalski nach Central-Asien unternommenen Reisen. Herausgegeben von der Kaiserlichen Akademie der Wissenschaften, Zoologischer Theil. Band ii. Vögel. Bearbeitet von Th. Pleske. Lief. i. Folio. St. Petersburg, 1889. [Russian and German.] (In progress.)
- (31) Dr. N. A. Sewertzow. Ornithologie du Turkestan et des Pays adjacents. Par M. le Docteur M. A. Menzbier. Livr. 1, 2. Folio. Moscou, 1888-89.
- (32) Eastern Persia: an account of the Journeys of the Persian Boundary Commission, 1870-72. Vol. ii. The Zoology and Geology, by W. T. Blanford, A.R.S.M., F.R.S. 8vo. London, 1876.
- (33) On a Collection of Birds from Fao, in the Persian Gulf. By R. Bowdler Sharpe, F.L.S. With Notes by the Collector, W. D. Cumming. Ibis, 1886, pp. 475-493.
- (34) On a Collection of Birds from Bushire, in the Persian Gulf. By R. Bowdler Sharpe, F.L.S., F.Z.S. Ibis, 1886, pp. 493-499.
- (35) Notes on a second Collection of Birds made by Mr. W. D. Cumming at Fao, in the Persian Gulf. By R. Bowdler Sharpe, F.L.S., &c. Ibis, 1891, pp. 103-117.

- (36) Die Fauna und Flora des südwestlichen Caspi-Gebietes: wissenschaftliche Beiträge zu den Reisen an der Persisch-Russischen Grenze. Von Dr. Gustav Radde. 8vo. Leipzig, 1886.
- (37) Die Vögel Transcaspiens. Von Dr. G. Radde und Dr. A. Walter. Orn. 1889, pp. 1-128 and 165-279.
- (38) Zoological Researches in Liberia. By J. Büttikofer. Notes Leyd. Mus. vii. p. 129.
- (39) Ornithologie d'Angola. Par J.V. Barboza du Bocage. 4to. Lisbonne, 1881.
- (39a) On Birds from the Congo and South-western Africa. By J. Büttikofer. Notes Leyd. Mus. x. p. 209.
- (39b) On a new Collection of Birds from South-western Africa. By J. Büttikofer. Notes Leyd. Mus. xi. p. 65.
- (39c) Third List of Birds from South-western Africa. By J. Büttikofer. Notes Leyd. Mus. xi. p. 193.
- (39d) Die ornithologischen Sammlungen der Deutschen Expedition nach der Loango-Küste. Bearbeitet von Dr. Ant. Reichenow. J. f. O. 1877, p. 1.
- (40) The Birds of South Africa, by Edgar Leopold Layard. New edition, thoroughly revised and augmented by R. Bowdler Sharpe. Royal 8vo. London, 1875-84.
- (41) Der ornithologische Nachlass Dr. Richard Böhm's. Gesichtet und herausgegeben von Herman Schalow. J. f. O. 1886, pp. 409-436; 1887, pp. 135-159 and 225-248.
- (41a) Uebersicht der von G. A. Fischer auf einer Zweiten Reise durch das Africanische Küstenland von Mombasa bis Wito und am Tanafluss gesammelten Vögel. Von Dr. G. A. Fischer und Dr. Ant. Reichenow. J. f. O. 1879, p. 337.
- (41b) Dr. Fischer's Ornithologische Sammlungen während der letzten Reise zum Victoria Nyansa. Von Dr. Ant. Reichenow. J. f. O. 1887, p. 38.
- (42) Uebersicht der von Dr. G. A. Fischer auf seiner im Auftrage der Hamburger Geographischen Gesellschaft unternommenen Reise in das Masailand gesammelten und beobachteten Vogelarten. Bearbeitet von Dr. G. A. Fischer. Zeitschr. f. d. g. Orn. 1884, p. 297.
- (43) Uebersicht der in Ostafrika gesammelten Vogelarten, mit Angabe der verschiedenen Fundorten. Von Dr. G. A. Fischer. J. f. O. 1885, pp. 113-142.
- (44) Ornithologische Notizen aus Central-Africa. Von Dr. R. Böhm. J. f. O. 1883, pp. 162-208; 1885, pp. 35-73.
- (44a) Die ornithologische Nachlass Dr. Richard Böhm's. I., II. u. III. J. f. O. 1886-87.
- (45) Dritter Beitrag zur Ornithologie der östlichäquatorialen Gebiete Afrikas. Von Dr. G. Hartlaub. Zool. Jahrb. Jena, ii. pp. 303-348.

- (46) Uebersicht der Vögel Ost-Afrikas, welche von den Herren J. M. Hildebrandt und v. Kalkreuth gesammelt sind. Bearbeitet von J. Cabanis. J. f. O. 1878, pp. 213-246.
- (46a) Uebersicht der von Dr. G. A. Fischer auf Sansibar und während einer Reise durch das Küstenland von Mombasa bis Wito gesammelten oder sicher beobachteten Vögel. J. f. O. 1878, p. 247.
- (47) Ueber eine Vogelsammlung aus Ostafrika. Von A. Reichenow. J. f. O. 1889, p. 264.
- (48) On Mr. E. Lort Phillips's Collection of Birds from Somali-land. By Captain G. E. Shelley, F.Z.S. Ibis, 1885, p. 389.
- (49) On the Collection of Birds made by Mr. H. H. Johnston in the Kilimanjaro District. With field-notes by H. H. Johnston. By Capt. G. E. Shelley, F.Z.S. P. Z. S. 1884, p. 554.
- (50) On the Birds collected by Mr. H. C. V. Hunter in Eastern Africa. By Captain G. E. Shelley, F.Z.S. P. Z. S. 1889, p. 356.
- (51) On the Birds collected by Mr. F. J. Jackson, F.Z.S., during his recent expedition to Uganda, through the territory of the Imperial British East-African Company. By R. Bowdler Sharpe. With notes by the Collector. Ibis, 1891.
- (52) Spedizione Italiana nell' Africa Equatoriale. Risultati Zoologici. Uccelli dello Scioa e della Regione fra Zeila e lo Scioa, per Tommaso Salvadori. Ann. Mus. Civ. Genova, ser. 2, vol. i. pp. 7-276 (1884).
- (53) Catalogo di una Collezione di Uccelli dello Scioa, fatta dal Dott. V. Ragazzi negli anni 1884-6. Per T. Salvadori. *Op. cit.* vi. p. 185.
- (54) On the Birds collected in Socotra and Southern Arabia by Dr. Emil Riebeck. By Dr. G. Hartlaub, F.M.Z.S. P. Z. S. 1881, pp. 953-959.
- (55) Histoire Physique, Naturelle et Politique de Madagascar, publiée par Alfred Grandidier. Vols. xii.-xv. Histoire Naturelle des Oiseaux, par MM. Alph. Milne-Edwards et Alf. Grandidier. Text, 1 vol. Atlas, 3 vols. 4to. Paris, 1876-85.
- (56) Stray Feathers, a Journal of Ornithology for India and its Dependencies. Edited by Allan Hume. Vols. i.-xi. 8vo. Calcutta, 1873-88.
- (57) The Fauna of British India, including Ceylon and Burma. Edited by W. T. Blanford. Birds, Vols. i., ii. By Eugene W. Oates. 8vo. London, Calcutta, Bombay, and Berlin, 1889-90.
- (58) The Nests and Eggs of Indian Birds. By Allan O. Hume, C.B. Second edition. Edited by Eugene William Oates. 3 vols. 8vo. London, 1889-90.
- (59) A Handbook to the Birds of British Burmah, including those found in the adjoining State of Karennee. By Eugene W. Oates. 2 vols. 8vo. London, 1883.
- (60) Viaggio di Leonardo Fea nella Birmania e nelle Regioni vicine. Uccelli raccolti nei Monti Carin a nord-est di Tounghoo, nel Pegù

presso Rangoon e Tounghoo, e nel Tenasserim presso Malewoon. Per Tommaso Salvadori. Ann. Mus. Civ. Genova, ser. 2, vol. vii. pp. 369-438 (1889).

- (61) Catalogo sistematico degli Uccelli di Borneo di Tommaso Salvadori, con note ed osservazioni di G. Doria ed O. Beccari intorno alle specie da essi raccolte nel Ragiato di Sarawak. Ann. Mus. Civ. Genova, vol. v. (1874).
- (62) On the Ornithology of Northern Borneo. By R. Bowdler Sharpe, F.L.S., &c. With Notes by John Whitehead. Ibis, 1889, pp. 63-85, 185-205, 265-283, 409-443; 1890, pp. 1-24, 133-149, and 273-292.
- (63) Ueber die neuesten Ergebnisse von Herrn F. J. Grabowsky's Ornithologischen Forschungen in Süd-Ost-Borneo. Von Prof. Dr. Wilh. Blasius. J. f. O. 1884, pp. 210-227.
- (64) On a Collection of Birds made by Mr. E. C. Buxton in the District of Lampong, S.E. Sumatra. By Arthur, Marquis of Tweeddale, M.B.O.U. Ibis, 1877, pp. 283-323.
- (65) Catalogo di una Collezione di Uccelli fatta nella parte occidentale di Sumatra dal Prof. Odoardo Beccari, e descritta da Tommaso Salvadori. Ann. Mus. Civ. Genova, xiv. pp. 169-253 (1879).
- (66) Contributions to the Ornithology of Sumatra. Report on a Collection from the neighbourhood of Padang. By R. G. Wardlaw Ramsay, F.Z.S. P. Z. S. 1880, pp. 13-16.
- (67) On Collections of Birds made by Mr. H. O. Forbes in South-eastern Sumatra. By Francis Nicholson, F.Z.S. Ibis, 1882, pp. 51-65.
- (67 a) On a Collection of Birds made by Dr. C. Klaesi in the Highlands of Padang (W. Sumatra). By J. Büttikofer. Notes Leyd. Mus. ix. p. 1.
- (68) Bataviasche Vogels. Door A. G. Vorderman. Natuurr. Tijdschr. v. Nederl. Indie, xli. pp. 182-211; xlii. pp. 32-128 and 192-240; xliii. pp. 89-123 and 176-197; and xliv. pp. 203-276.
- (69) Field-notes on the Birds of Celebes. By A. B. Meyer, M.D., C.M.Z.S. Part i. *Psittaci*, *Rapaces*, and *Picariæ*. Ibis, 1879, pp. 43-70. Part ii. pp. 125-147.
- (70) Intorno a due collezioni di Uccelli di Celebes inviate al Museo Civico di Genova, dal Dr. O. Beccari e dal Sig. A. A. Bruijn. Note di Tommaso Salvadori. Ann. Mus. Civ. Genova, vii. pp. 641-681 (1875).
- (71) Beiträge zur Ornithologie von Celebes und Sangir. Von Dr. Friedrich Brüggemann. Abhand. nat. Ver. Bremen, v. pp. 35-102.
- (72) Ueber neue und zweifelhafte Vögel von Celebes. Von Wilhelm Blasius. J. f. O. 1883, pp. 113-162.
- (73) A List of the Birds known to inhabit the Philippine Archipelago. By Arthur, Viscount Walden, F.R.S. Trans. Zool. Soc. ix. pp. 125-252 (1875).

- (74) On the Birds collected by Professor J. B. Steere in the Philippine Archipelago. By R. Bowdler Sharpe, F.L.S., F.Z.S., &c. Trans. Linn. Soc. London (Zool.), i. pp. 307-356 (1877).
- (75) Revised List of the Birds known to occur in the Philippine Islands, showing their Geographical Distribution. Compiled by Major R. G. Wardlaw Ramsay. Tweeddale's Memoirs, Appendix, pp. 653-660.
- (76) Contributions to the Ornithology of the Philippine Islands. I. On two Collections of Birds from the Vicinity of Manilla. By R. G. Wardlaw Ramsay, F.Z.S., M.B.O.U., &c. Ibis, 1884, pp. 330-335.—II. On Additional Collections of Birds. By R. G. Wardlaw Ramsay, F.Z.S., M.B.O.U. Ibis, 1886, pp. 155-162.
- (77) A List of the Birds and Mammals collected by the Steere Expedition to the Philippines. By J. B. Steere, Ph.D. 8vo. Ann Arbor, Mich., 1890. (See also above, pp. 301-316.)
- (78) Ornitologia della Papuasie e delle Molucche di Tommaso Salvadori. 3 vols. 4to. Torino, 1880-82.
- (79) Aggiunte alla Ornitologia della Papuasie e delle Molucche per Tommaso Salvadori. 2 parts. 4to. Torino, 1889-90.
- (80) The Birds of New Guinea and the adjacent Papuan Islands, including many new species recently discovered in Australia. By John Gould, F.R.S., completed after the Author's death by R. Bowdler Sharpe, F.L.S., &c. 5 vols. Folio. London, 1875-88.
- (81) The Birds of Australia. By John Gould, F.R.S. 7 vols. Folio. London, 1840-48.
- (82) The Birds of Australia. By John Gould, F.R.S. Supplement. Folio. London, 1851-69.
- (83) Tabular List of all the Australian Birds at present known to the author, showing the distribution of the species over the continent of Australia and adjacent Islands. By E. P. Ramsay, LL.D., F.R.S.E., &c. Small 4to. Sydney, 1888.
- (84) A History of the Birds of New Zealand. By Sir Walter Lawry Buller, K.C.M.G., D.Sc., F.R.S., &c. Second edition. 2 vols. Folio. London, 1887-88.
- (85) Notes on the Avifauna of New Caledonia. A Catalogue of the Birds of the Island known to E. L. and E. L. C. Layard. With remarks by the Rev. Canon Tristram. Ibis, 1882, pp. 493-546.
- (86) Remarks on the Avifauna of the Sandwich Islands. By P. L. Sclater, M.A., Ph.D., F.R.S., &c. Ibis, 1871, pp. 356-362.
- (87) Aves Hawaienses: The Birds of the Sandwich Islands. By Scott B. Wilson, F.Z.S., assisted by A. H. Evans, M.A., F.Z.S. Part I. 4to. London, 1890.
- (88) Results of a Biological Survey of the San Francisco Mountain Region and Desert of the Little Colorado, Arizona. By Dr. C.

Hart Merriam and Dr. Leonhard Stejneger. U. S. Department of Agriculture (Ornithology and Mammalogy), North American Fauna. No. 3.

- (89) A History of North-American Birds. By S. F. Baird, T. M. Brewer, and R. Ridgway. Land-Birds. 3 vols. 4to. Boston, 1874.
- (90) The Water-Birds of North America. By S. F. Baird, T. M. Brewer, and R. Ridgway. 2 vols. 4to. Boston, 1884.
- (91) The Code of Nomenclature and Check-List of North-American Birds, adopted by the American Ornithologists' Union, being the Report of the Committee of the Union on Classification and Nomenclature. 8 vols. New York, 1886.
- (92) Supplement to the Code of Nomenclature and Check-List of North American Birds adopted by the American Ornithologists' Union, prepared by a Committee of the Union. 8vo. New York, 1889.
- (93) Nomenclator Avium Neotropicalium. Auctoribus Philippo Lutley Selater, A.M., Phil. Doct., et Osberto Salvin, A.M. Small folio. Londini, 1873.
- (94) Catalogue of the Birds of Dominica, from collections made for the Smithsonian Institution by Frederick A. Ober, together with his Notes and Observations. By George N. Lawrence. P. U. S. N. M. 1878, pp. 48-69.
- (95) Catalogue of the Birds of St. Vincent, &c. Id. pp. 185-198.
- (96) Catalogue of the Birds of Antigua and Barbuda, &c. Id. pp. 232-242.
- (97) Catalogue of the Birds of Grenada, &c. Id. pp. 265-278.—Catalogue of the Birds collected in Martinique, &c. Id. pp. 349-360.—Catalogue of a Collection of Birds obtained in Guadeloupe, &c. Id. pp. 449-462.
- (98) A General Catalogue of the Birds noted from the Islands of the Lesser Antilles visited by Mr. Fred. A. Ober; with a table showing their Distribution, and those found in the United States. Id. pp. 486-488.
- (99) The Birds of Haiti and San Domingo. By Charles B. Cory. 4to. Boston, 1885.
- (100) Birds of the Bahama Islands, containing many Birds new to the Islands, and a number of undescribed winter plumages of North American species. By Charles B. Cory. 2 editions. 4to. Boston, 1880 and 1890.
- (101) A List of the Birds of the West Indies, including the Bahama Islands and the Greater and Lesser Antilles, excepting the Islands of Tobago and Trinidad. By Charles B. Cory. 2 editions. 4to. Boston, 1885 and 1886.
- (102) The Birds of the West Indies, including all species known to occur in the Bahama Islands, the Greater Antilles, the Caymans, and

- the Lesser Antilles, excepting the Islands of Tobago and Trinidad. By Charles B. Cory. 4to. Boston, 1889.
- (103) List of Birds collected by Mr. Ramage in Dominica, West Indies. By P. L. Selater, M.A., Ph.D., F.R.S. P. Z. S. 1889, pp. 326-327.
- (104) List of Birds collected by Mr. Ramage in St. Lucia, West Indies. By P. L. Selater, M.A., Ph.D., F.R.S. P. Z. S. 1889, pp. 394-395.
- (105) *Biologia Centrali-Americana. Aves.* By Osbert Salvin, M.A., F.R.S., &c., and Frederick DuCane Godman, F.R.S., &c. 4to. London, 1879-1890. [In progress.]
- (106) *Catálogo de las Aves de Costa Rica.* Con indicación de las especies, localidades, y número de ejemplares contenidos en la colección de Museo Nacional. Por José C. Zeledón. *Anales Mus. Nac. Costa Rica*, i. pp. 103-135.
- (107) On a Collection of Birds from Nicaragua. By Charles C. Nutting. *Proc. U.S. N. M.* 1883, p. 372.
- (108) On the Birds collected by the late Mr. T. K. Salmon in the State of Antioquia, United States of Colombia. By P. L. Selater, M.A., Ph.D., F.R.S., and Osbert Salvin, M.A., F.R.S. P. Z. S. 1879, pp. 486-550.
- (109) *Liste des Oiseaux recueillis par MM. Stolzmann et Siemiradzki dans l'Ecuador occidental.* Par le Comte H. v. Berlepsch et L. Taczanowski. P. Z. S. 1883, pp. 536-577; 1884, pp. 281-313; and 1885, pp. 67-124.
- (110) *Ornithologie du Pérou.* Par Ladislas Taczanowski. 3 vols. and tables. 8vo. Rennes, 1884-86.
- (111) On the Birds collected in Bolivia by Mr. C. Buckley. By P. L. Selater, M.A., Ph.D., F.R.S., and Osbert Salvin, M.A., F.R.S. P. Z. S. 1879, pp. 588-645.
- (112) List of the Birds collected in Bolivia by Dr. H. H. Rusby, with Field-Notes by the Collector. By J. A. Allen. *Bull. Amer. Mus. N. H.* ii. pp. 77-112.
- (113) Descriptions of new Species and Genera of Birds from the Lower Amazon. By Robert Ridgway. P. U. S. N. M. 1887, pp. 516-528.
- (114) *Systematisches Verzeichniss der von Herrn Gustav Garlepp in Brasilien und Nord-Peru im Gebiete des oberen Amazonas gesammelten Vogelbälge.* Von Hans von Berlepsch. J. f. O. 1889, pp. 97-101, 289-321.
- (115) A List of the Birds obtained by Mr. Henry Whitely in British Guiana. By Osbert Salvin, M.A., F.R.S., &c. *Ibis*, 1885, pp. 195-219, 291-306, 418-439; 1886, pp. 57-78, 168-181, 499-510.
- (116) *Die Vögel der Lagoa dos Patos, eine Zoo-Geographische Studie,* von Dr. Hermann von Jhering. *Zeitschr. ges. Ornith.* iv. pp. 142-165 (1888).
- (117) *Zur Ornithologie der Provinz Santa Catharina, Süd-Brasilien.* Von

Hans Graf v. Berlepsch. J. f. O. 1873, pp. 225-293; 1874, pp. 241-284.

- (118) Die Vögel der Umgegend von Taquara do Mundo Novo, Prov. Rio Grande do Sul. Von Hans von Berlepsch und Dr. Hermann von Jhering. Zeitschr. ges. Ornith. ii. pp. 97-184 (1885).
- (119) Systematisches Verzeichniss der von Herrn Ricardo Rohde in Paraguay gesammelten Vögel, von Hans von Berlepsch. J. f. O. 1887, pp. 1-37.
- (120) Argentine Ornithology. A Descriptive Catalogue of the Birds of the Argentine Republic. By P. L. Selater, M.A., Ph.D., F.R.S., &c. With Notes on their Habits by W. H. Hudson, C.M.Z.S. 2 vols. Royal 8vo. London, 1888-89.
- (121) Cruise of the 'Alert.' Four Years in Patagonian, Polynesian, and Mascarene Waters (1878-82). By R. W. Coppinger, M.D. Royal 8vo. London, 1883.
- (122) Report on the Zoological Collections made in the Indo-Pacific Ocean during the Voyage of H.M.S. 'Alert,' 1881-2. 8vo. London, 1884.
- (123) List of Chilian Birds, compiled by Harry Berkeley James, F.Z.S. Royal 8vo. Valparaiso, 1885.
- (124) List of a Collection of Birds from the Province of Tarapacá, Northern Chili. By P. L. Selater, M.A., Ph.D., F.R.S. P. Z. S. 1886, pp. 395-404.
- (125) On a Second Collection of Birds from the Province of Tarapacá, Northern Chili. By P. L. Selater, M.A., Ph.D., F.R.S. P. Z. S. 1891, pp. 131-137.

XLIV.—*On the Birds of Madagascar, and their Connection with Native Folk-lore, Proverbs, and Superstitions.*
By the Rev. JAMES SIBREE, Jr., F.R.G.S.*—Part III.

[Continued from p. 443.]

IV.—THE PIGEONS.

THE Pigeons and some few allied birds form, in Dr. R. B. Sharpe's system of classification, an Order of themselves, and are divided into three families, consisting of (a) the now extinct Dodos, of which five species at least lived in the Mascarene Islands until within the last 250 years, but are not as yet known to have inhabited Madagascar; (b) the

* Reprinted from the 'Antananarivo Annual,' 1890, with additions and corrections by the Author.